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**METHODOLOGICAL AND CONCEPTUAL ISSUES
IN UNDERSTANDING ABILITY-PERFORMANCE
RELATIONSHIPS: FINAL REPORT**

BENJAMIN SCHNEIDER



Research Report No. 25

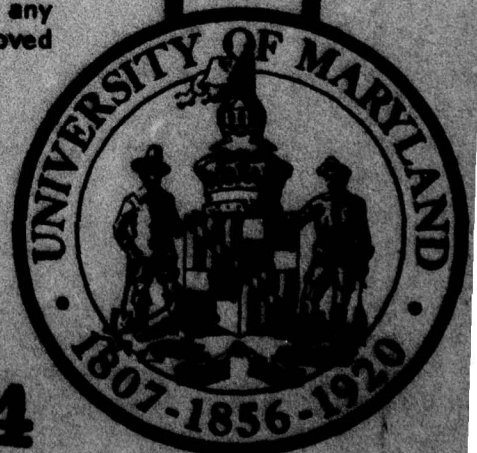
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20. (continued)

Also included in this Report is a list of publications accomplished under this Contract.

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METHODOLOGICAL AND CONCEPTUAL ISSUES IN
UNDERSTANDING ABILITY-PERFORMANCE RELATIONSHIPS:
FINAL REPORT

Benjamin Schneider

"The potential benefits of reliable and valid prediction of individual performance are to be felt in virtually every activity engaged in by an organization" (Bass & Barrett, 1972, p. 244). Yet in the past forty or more years there have been only modest improvements in the prediction of eventual job performance from traditional ability measures administered at the time of initial selection (Guion, 1965). It seemed that there was much to be gained by drawing on additional resources in an attempt to enhance the prediction of performance based on ability measures alone -- resources from within the individual, from the work environment, and from the prediction process itself.

A major goal of this research, then, was to explore two types of non-ability variables that may enhance the prediction of performance and/or affect the ability-performance relationship--those which represent individual differences and those which represent variations in the work environment. Previous investigations into personal variables that may affect the ability-performance relationship have tended to be haphazard, relying heavily on available selection instruments and failing to clearly conceptualize in advance how and why any given personal characteristic should be related to ability and/or performance. It was our intention to carefully specify and measure a few non-ability attributes of people that we had reason

to believe may add to and/or interact with ability in the prediction of job performance.

Similarly, we examined contextual variables, or attributes of the environment in which people work, as potential contributors to the prediction of performance. These variables have been given scant attention in personnel selection studies (Flaugher, 1974; Schneider, 1978), resulting in a concentration on individual variables as the sole cause of task performance. Such a person-oriented focus has prevented us from understanding how organizations, through their practices and procedures, could intervene in ways that will improve the predictability of performance by ability measures. Moreover, the inclusion of situational variables in the prediction of performance can permit an organization to see the impact of its own policies and procedures on the overall level of productivity.

In addition, our research effort was concerned with investigating the interactive effects of specific personal characteristics in specific environments. This reflects the idea that "...integration of the study of individual differences and basic behavioral processes can begin to occur most readily... by ... specification and empirical documentation suggested by the paradigm, $B = f(P, E)$. It requires... a conceptual orientation that never loses sight of either the P or the E but which focuses interest on the comma, the nature of the interaction. That is where the action is" (Atkinson, 1974, p. 408).

A second goal of our research was an attempt to enhance the prediction of performance by the careful selection and use of the most appropriate psychometric models. Previous experimentally-oriented approaches to

understanding and enhancing ability-performance relationships, such as procedures designed to remove response biases from ratings, or to eliminate cultural variance from tests, or to provide identical working conditions for all employees, have not been highly successful. An alternative suggested here was to approach the problem through the use of more appropriate statistical techniques, techniques selected to fit the premises presented earlier and the evidence already available in the behavioral science literature.

Statistical models used in the past have often resulted in disappointing outcomes because relationships between variables were inadequately conceptualized or because less than optimal statistical procedures were employed. For example, interactions of variables often have either not been tested or have been arbitrarily dichotomized or trichotomized to fit an analysis of variance design (Cohen & Cohen, 1975). Our approach was to employ models which maximized the use of available data and best fit our hypotheses.

The remainder of this report summarizes the writings and research undertaken in pursuit of these two major goals. First, the efforts detailing methodological considerations in the prediction of performance are summarized. Then the works which explored the contribution of non-ability individual differences and situational variables to the prediction problem are reviewed. Finally, a list of publications associated with the Contract is presented.

METHODOLOGICAL ISSUES

The papers with a predominantly methodological focus range over topics as diverse as the content validity of predictors, the moderated multiple regression model for predicting performance, and racial bias in performance ratings. These papers, then, examine a number of the problems researchers face as they attempt to operationalize their constructs and conduct their data analyses.

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Bartlett, C. J., Bobko, P., Mosier, S. B., & Hannan, R. L. "Testing For Fairness With a Moderated Multiple Regression Strategy: An Alternative to Differential Analysis." In, B. Schneider (Ed.) "Some Conceptual and Methodological Issues in Understanding Ability-Performance Relationships." ADA046691

Bartlett, et al. concentrated on the legal issue of race as a moderator of ability-performance relationships but the models they presented are applicable to the study of any algebraic interaction--between ability and race, ability and sex, ability and access to power, or ability and goal setting condition. Perhaps the critical issue they addressed was that an algebraic interaction can be considered statistically significant only when the beta weight attached to the interaction term is significant after the linear effects have been entered into the regression equation. It was clear from their paper that only when a variable thought to moderate a relationship meets this criterion can it be called a moderator, and that

few studies looking at race and sex as potential moderators achieve anything more than single group validity. Demonstrating single group validity does not indicate a moderator effect because the algebraic interaction term in the moderated multiple regression model will not be statistically significant.

* * * * *

Schmidt, F. L., & Hunter, J. E. "Moderator Research and the Law of Small Numbers." In. B. Schneider (Ed.) "Some Conceptual and Methodological Issues in Understanding Ability-Performance Relationships." ADA046691

Schmidt and Hunter noted that large-scale reviews of the literature on the validity of tests suggest the probabilities are high that one will find a significant relationship between an adequately chosen predictor and a carefully developed criterion when samples are large. That is, evidence which has accumulated (prior probabilities) indicates we have been doing *b e t t e r* in accurately predicting job behavior than our typical small-sample studies lead us to believe.

Schmidt and Hunter proceeded to list a number of potential sources of error which, in any one study, prevent us from observing the "true" validity of a given ability measure. They further showed that when these sources of error (small sample sizes, criterion unreliability, restriction of range, criterion contamination and deficiency) are corrected for in a study, the potential for finding a statistically significant algebraic interaction term between ability and some other personal (age, sex) or situational

attribute (in their case, job type) is very small.

* * * * *

Owens, W. A. "Moderators and Subgroups." In, B. Schneider (Ed.) "Some Conceptual and Methodological Issues in Understanding Ability-Performance Relationships." ADA046691

Owens' paper suggested the somewhat radical idea that an individual's group membership, as determined by biodata, is the best predictor of that individual's behavior. The logic of this paper was that moderator variables are irrelevant because all of the potential mathematically derived algebraic interactions in the prediction of behavior are taken into account by knowing a person's biodata group. That is, biodata group membership accounts for natural interactions making the generation or derivation of mathematical interactions redundant, at best. Owens marshalled a considerable amount of data to support his conclusions.

* * * * *

Outtz, J. L. "Racial Bias as a Contaminant of Performance Evaluations." ADA037814

Outtz' research explored one kind of criterion contamination, racial bias. Specifically, his research assessed the degree to which rating behavior is affected by the race of rater and ratee.

Eight hypothetical college instructors were evaluated by 174 white and 129 black college students. Each instructor's teaching performance was

described using statements of predetermined favorability. Three levels of teaching performance, good, average, and poor were described. The race of the instructors was manipulated through the use of photographs. Each subject evaluated every instructor in terms of (a) quality of performance, (b) promotability, (c) agreement with his teaching philosophy, (d) agreement with his philosophy about students and (e) expected change in future performance.

Race of rater and ratee was not related to the performance evaluations of good instructors. Where teaching performance was described as poor, white raters favored white instructors over black instructors in terms of quality of performance. Where teaching performance was described as average, white raters favored average black instructors over white instructors in terms of promotability. Black raters favored average black instructors over average white instructors in terms of quality of performance and promotability. It was deduced that performance ratings were based primarily on teaching performance, but, when teaching performance was not exceptional, rater-ratee racial similarity was a factor as well.

When teaching performance was described as very good, there was no significant relationship between rater-ratee racial similarity and agreement with the ratee's beliefs. However, white raters indicated that they would agree more with the beliefs of a poor white instructor than a poor black instructor. Black raters indicated that they would agree more with the beliefs of an average black instructor than an average white instructor. It was concluded that perceived belief similarity was based more on teaching performance than race, but, when teaching performance was not exceptional,

rater-ratee racial similarity was a factor. Manipulation of the independent variable was not sufficient to determine the effects of cognitive balance on rating behavior.

* * * * *

Katcher, B. L., & Bartlett, C. J. "Rating Errors of Inconsistency as a Function of Dimensionality of Behavioral Anchors."

Katcher and Bartlett explored the problem of rater inconsistency in performance appraisal schemes utilizing behaviorally anchored rating scales. Rater inconsistency is an issue when researchers assume that raters can locate a ratee at one point on a behaviorally anchored scale such that the ratee would unambiguously be considered better than all anchors on that scale representing lower levels of effectiveness and worse than all anchors on the scale indicating higher levels of effectiveness. This assumption on the part of researchers implicitly further assumes unidimensionality of the scale. Thus, Katcher and Bartlett hypothesized that behaviorally anchored rating scales which are more nearly unidimensional will lead to fewer errors of inconsistency.

The hypothesis was tested using a Mixed Standard Rating Scale (Blanz & Ghiselli, 1972; Saal & Landy, 1977). Sixty-nine police sergeants were rated by 35 lieutenants and 25 lieutenants were rated by 13 captains.

Each of the ten a priori behavioral dimensions was separately analyzed by principal components analysis. Indices of unidimensionality derived from this analysis were: proportion of variance accounted for by the first principal component and, the ratio of the proportion of variance accounted for

by the first principal component to the proportion of variance accounted for by the second principal component. Both indices were strongly related to actual rating inconsistencies for the ratings of both sergeants and lieutenants ($\bar{r} \approx .75$).

* * * * *

Schneider, B., & Dachler, H. P. "A Note on the Stability of the Job Descriptive Index (JDI)." ADA056259

Schneider and Dachler addressed the issue of criterion stability in this paper, specifically the stability of an attitudinal measure. They noted that given the recent emphases on quality of work life as an important work outcome, selection researchers will be concerned with the prediction of job satisfaction and other affective reactions to the work place.

A management sample ($N = 541$) and a non-management sample ($N = 306$) of utility company employees completed the Job Descriptive Index (Smith, Kendall & Hulin, 1969) on two occasions separated by 16 months. The results indicated good stability for the JDI in both samples (r_{tt} between .46 and .66). In addition, Schneider and Dachler showed that the JDI retained good convergent and discriminant validity as revealed by correlations of the t_1 and t_2 data.

Summary

The Bartlett, et al. and Schmidt and Hunter papers directly addressed some of the problems with establishing and finding statistically significant algebraic interaction terms in the prediction of performance. Their

positions forcefully stress the desirability of exploring the contribution of linear combinations of variables and correction for contamination and range restriction prior to searching for nonlinear effects in the prediction of performance. Subsequent efforts, to be described, attempted to follow these admonitions, especially the rule to seek linear effects first.

The Owens and Guion papers had less direct impact on the research efforts to be described. Owens' idea of biodata clusters was not pursued but his concept of "fit" was employed in Hannan's research. Similarly, while no content validity studies were attempted, Guion's remarks vis a vis the desirability of testing constructs can be said to characterize the research efforts to be described below.

Outtz' research, the paper by Katcher and Bartlett, and the study by Schneider and Dachler were the only studies of criteria carried out under this Contract. The issues raised by them, racial bias in appraisal, the influence of rating scale dimensionality on rater errors, and the prediction of affective reactions to work, deserve more complete attention because of their relevance to contemporary personnel problems.

CONCEPTUAL ISSUES

This section of the report summarizes a series of theoretical papers and research efforts that explore the contribution of non-ability individual differences and actual, as well as perceived, situational variation to the prediction of performance. These non-ability variables are considered for their contribution to the prediction of performance in both linear combination and in interaction with ability. For convenience, papers in this section will be presented in three sections: (1) Literature reviews and

non-empirical papers which draw on contemporary issues in organizational psychology for suggestions regarding potential situational issues for study; (2) Laboratory research which attempts to isolate the role of various environmental variables in the prediction of performance; and (3) Field studies of individual and environmental variables.

Literature Reviews and Theory Papers

In addition to the non-empirical papers discussed in this section, two papers to be described below under Field Research contain major literature reviews: (1) Howard's paper reviews the ability x motivation literature with special emphasis on task-related intrinsic motivation; and (2) Hannan's report which also examines the general ability x motivation literature but with an emphasis on person-situation interaction or fit, especially the person variables of locus of control, need for achievement and bureaucratic values.

* * * * *

Wanous, J. P. "Realistic Job Previews: Can a Procedure to Reduce Turnover Also Influence the Relationship Between Abilities and Performance?" In, B. Schneider (Ed.) "Some Conceptual and Methodological Issues in Understanding Ability-Performance Relationships." ADA046691

Wanous' paper revealed that no attempts had been made to concurrently study ability-performance relationships and the impact of realistic job previews (RJPs) on that relationship or the contribution of RJPs to the prediction of performance. Thus, the literature concerned with the

organizational entry process has been unconnected to the prediction of individual behavior. Wanous' conceptualization of the issue suggests that one need only believe in an interaction between ability and motivation in order to conduct such studies.

Another aspect of Wanous' paper that was of interest was the paucity of research available on the entry part of the selection process. Selection research has failed to pay attention to the possibility that the selection process itself may have an impact on the validity and utility of prediction devices or serve as an additional predictor of behavior.

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Schein, V. E. "The Effects of Sex-Role Stereotyping on the Ability-Performance Relationship: Prior Research and New Directions."

In, B. Schneider (Ed.) "Some Conceptual and Methodological Issues in Understanding Ability-Performance Relationships." ADA046691

Schein's paper noted that sex-role stereotyping in organizations may serve to depress the possibility that women will be able to manifest their abilities in work settings. In particular, she emphasized power acquisition and the power process in organizations and the various ways in which women are systematically excluded from positions of power (e.g., through placement, tokenism, supervisory bias, pay, selection). This exclusion, she noted, results in a lack of opportunity for women to express the full range of their abilities. The hypothesized outcomes of such blockage are a depressed relationship between ability and performance

and lower average levels of performance for women.

* * * * *

Schneider, B. "Person-Situation Selection: A Review of Some Ability-Situation Interaction Research." In, B. Schneider (Ed.) "Some Conceptual and Methodological Issues in Understanding Ability-Performance Relationships." ADA046691

Schneider's paper reviewed the few work-related studies in the literature which attempted to concurrently examine ability and situation variables in the prediction of on-the-job performance. He presented field and laboratory studies of three kinds of work environment variables, each of which seemed to contribute to performance prediction: (1) reward system variables, including incentive and equity issues; (2) job or task issues such as job challenge or task difficulty; and (3) work climate, including more macro social issues like supervision, management philosophy, and so forth.

Schneider's report concluded with an hypothesis that when organizations reward, support and expect individuals to work up to their fullest levels of ability that validity coefficients, performance, and job satisfaction should all be improved.

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Schneider, B. "Personnel Selection and Organizational Behavior: An Integrated View." ADA036740

This paper by Schneider was a less technical version of the Schneider

paper just described. It was written as a convention presentation and as a preliminary version of the more detailed paper.

Laboratory Studies

The reports in this section each examine a very specific facet of person-situation research: Erez, and Locke, Mento and Katcher studied the role of goals in predicting task performance while Parkington and Schneider conducted a lab study in an attempt to understand the interaction of a realistic task preview and ability.

* * * * *

Locke, E. A., Mento, A. J., & Katcher, B. L. "The Interaction of Ability and Motivation in Performance: An exploration of the Meaning of Moderators." In, B. Schneider (Ed.) "Some Conceptual and Methodological Issues in Understanding Ability-Performance Relationships." ADA046691

Locke, et al. were concerned with the conditions under which ability would predict performance. They hypothesized that when a group of individuals is homogeneous with respect to motivation (i.e., they all have the same goal) then ability measures will be more accurate predictors of performance than when a group is motivationally heterogeneous.

Using a work sample test as the ability measure, Locke et al. created six goal-setting conditions: specific-hard ($N = 44$), specific-moderate ($N = 27$), specific-easy ($N = 25$), general-hard ($N = 57$), general-moderate ($N = 52$), and general-easy ($N = 27$).

Generally, ability-performance correlations were the same within each specific goal group regardless of level of goal difficulty ($\bar{r} \approx .90$) but were variable and significantly lower in the general goal groups ($\bar{r} \approx .73$). However, while the correlation between ability and performance within each goal difficulty level was essentially the same, the absolute levels of performance were significantly different. Thus, the linear combination of ability and goal difficulty was the best predictor of performance. Indeed, goal specificity also contributed significantly to the prediction.

* * * * *

Erez, M. "Feedback: A Necessary Condition for the Goal Setting-Performance Relationship." ADA026287

While the Erez report did not use ability as a predictor, it did test an hypothesis related to a condition under which ability may predict performance: goal setting. Thus, as revealed in the Locke, et al. work, previously described, goal difficulty and ability may combine to usefully predict performance.

Of concern to Erez was how feedback serves to facilitate the relationship between goals and performance. She predicted that feedback and goals would be interactively related to performance because feedback facilitates the display of individual differences in self-set goals.

In a laboratory setting, one group was provided feedback ($N = 38$) on performance while another group received no feedback ($N = 48$). In the feedback condition the relationship between goals and performance

was $r = .60$; in the no feedback condition the correlation was $r = .01$.

* * * * *

Parkington, J. P., & Schneider, B. "A Laboratory Study of Some Effects of a Realistic Task Preview." ADA055879

Parkington and Schneider's effort was an attempt to directly test some suggestions regarding an ability x realistic job preview (RJP) interaction as proposed by Wanous (see p. 11). Parkington and Schneider developed a motivation-based hypothesis that realism would have a main effect on performance and an interactive effect with ability on performance. Thirty-six college students were studied in a laboratory setting working at a real task (evaluating credit card applications for risk). Ability was found to correlate with performance and the RJP with affect but no main effects or interactions of the RJP were observed in relation to performance.

Field Studies

Two relatively small field studies designed as exploratory research (Schneider, and Schneider, Parkington & Mosier) and three major efforts are summarized in this portion of the report. The three major studies (those by Hoffman, Howard, and Hannan) will be described in greater detail than the preceding for they represent attempts to more fully explore the contribution of non-ability individual and situational variables to the prediction of performance.

* * * * *

Schneider, B. "Person-Situation Selection Research: The Problem of Identifying Salient Situational Dimensions." ADA037534

This exploratory study was an attempt to deal with the difficult problem of assessing "the situation." Because of a lack of taxonomic research on work situations, it was reasoned that questionnaires which ask people to respond to all questions may be fruitless. Thus, concentrating on recognition as compared to recall, may yield data for individuals with respect to personally non-relevant work facets.

Sixty-seven utility company employees were interviewed and the interviews were taperecorded. Content analysis revealed 15 facets of work adequately represented the domain of situational features used in describing the work setting. Frequency counts revealed that only 4 of the 15 facets (promotion/evaluation, company management, pay/security, and supervision) were mentioned by more than 60% of the interviewees.

* * * * *

Schneider, B., Parkington, J. J. & Mosier, S. B. "Some Relationships Between the Ability Requirements and Reward Attributes of Tasks."

A persistent problem in field studies of ability-situation research is the lack of significant algebraic interaction terms after ability and situation variables are entered into a regression equation predicting performance. One hypothesis with respect to this failure is that attributes of the work setting are correlated with attributes of the

Individuals in those settings. If this were true then extremes on either the ability or situation variables would not exist and the chances for finding significant interactions would be reduced.

This report examined the relationship between the psychological reward attributes of tasks (e.g., variety, autonomy) and the abilities required for task performance (the GATB aptitudes) for 140 jobs. Each job was rated for its psychological rewards and the abilities required were obtained from the Dictionary of Occupational Titles. Results revealed low but significant correlations between the two sets of variables and then primarily for Verbal and Numerical aptitudes and Variety and Autonomy rewards ($\bar{r}'s \approx .35$). Results were replicated for a second sample of 79 jobs.

* * * * *

Hoffman, R. G. "Ability, Involvement and Climate as Multiple and Interactive Predictors of Performance."

This paper reviews some of the mathematical models useful for exploring potential joint effects of ability and situation on performance and then discusses some conceptual issues regarding the utility of treating "the situation" in terms of individual or aggregated perceptions. Thus, one methodological problem in conducting field research on ability-situation issues is that unless multiple situations are available the only basis for analysis is the individually perceived situation. Two other problems become manifest, however, when multiple situations are available for research: invariably different ability measures and different

performance criteria are used.

Hoffman, studying 75 sections (total $N \approx 800$) of an introductory mathematics course, was able to avoid all of the above problems. Students in each class completed a faculty/class evaluation questionnaire, indicated their student ID number and their SAT Math scores. With the student ID number it was possible to match each student's perceptions of the class with his/her mathematics test scores, providing a common criterion measure. The SAT Math score data provided a common ability measure as a predictor.

Two parallel regression analyses were conducted, one in which each student's situation data were his/her own perceptions (the individual analysis) and one in which each student was assigned his or her section average for the situation data (the climate analysis). In each hierarchical regression analysis, ability data were entered first and the criterion was the sum of five examinations.

Results showed that SAT Math was correlated $r = .33$ with performance. In addition, for the individual analysis, 3 of 5 class situation perceptions contributed significantly to the prediction of performance ($R = .50$). No ability \times situation interactions were significant for the individual analyses.

For the climate analyses, average within-class scores were used as the situation data. For this analysis, the multiple R for ability and climate in linear combination was .50 and the inclusion of a significant interaction term resulted in $R = .51$.

* * * * *

Howard, A. "Intrinsic Motivation and its Determinants as Factors Enhancing the Prediction of Job Performance from Ability." ADA026530

Performance is often hypothesized to be a function of the interaction of ability and motivation, but past studies of this hypothesis have been sparse, and the researchers often used inadequate measures and inappropriate statistical analyses. The primary purpose of the present research was to explore the relationship of ability and intrinsic motivation in the prediction of job performance. Intrinsic motivation was traced to two primary determinants. One, an organizational factor, is the extent to which an employee's job is "enriched," or incorporates challenging elements such as autonomy and variety. A second determinant is an individual difference factor--the extent to which the individual desires to achieve and grow.

Two primary hypotheses were tested: (1) $\text{Performance} = \text{Ability} + \text{Intrinsic motivation} + (\text{Ability} \times \text{Intrinsic Motivation})$, and (2) $\text{Intrinsic motivation} = \text{Individual growth need strength} + \text{Enriched job characteristics} + (\text{Individual growth need strength} \times \text{Enriched job characteristics})$. A third hypothesis was the same as hypothesis two, but predicted the criterion of satisfaction with opportunities for growth on the job.

Howard collected data from clerical employees in a large, metropolitan bank. The final sample consisted of 353 employees in 11 job groups. Ability was measured by a pre-employment clerical aptitude test; information about job characteristics, individual growth needs, growth satisfaction, and intrinsic motivation was obtained by an employee questionnaire;

and job performance was measured by supervisors' evaluations.

The hypotheses were tested by hierarchical moderated multiple regression. All multiple R's were statistically significant, showing initial support for the hypotheses. Ability and intrinsic motivation combined in an additive way but not in an interactive way in predicting job performance. Intrinsic motivation was predicted only by the enriched job characteristics, and growth satisfaction was predicted positively by the enriched job characteristics and negatively by growth need strength. A modified model demonstrated that ability, enriched job characteristics and growth need strength each add significantly and positively to the prediction of job performance, but no interactions among the variables made significant contributions to the prediction.

* * * * *

Hannan, R. L. "Work Performance as a Function of the Interaction of Ability, Work Values, and the Perceived Work Environment."

Hannan's research attempted to integrate the various earlier reviews and studies by focussing on ability, three non-ability individual variables (achievement motivation, locus of control, and bureaucratic values), and the perceived situation. After extensively reviewing literatures in each of those three domains, as well as the extant literature on ability x motivation interaction, Hannan proposed an interactionist model for study.

The interactionist model emphasized the importance of the fit or congruence of the three personal traits to the perceived work environment. Thus, it was hypothesized that an increased fit between the work-related

attributes of the person and those of the perceived work setting will elicit greater work motivation only to the extent that the personal attributes are strong and positively oriented. Performance was conceptualized as a function of the linear combination of ability (A) and motivation (M) plus $A \times M$.

The sample studied consisted of 493 police officers from a large suburban police department. Various ability measures were administered and combined into a composite ability score for each officer, a measure of worker values was developed, and the measure of the perceived work environment (PWE) employed was the one developed under a previous ONR Contract (Schneider & Dachler, Note 1). The PWE was coded to yield items which seemed to indicate they were facilitative of the display of the items used to measure the personal traits. This coding procedure permitted an index of fit to be developed across items, providing for the interactionist index of motivation. Finally, two different rating scales of performance (a behaviorally anchored rating scale and a forced choice measure) were developed to provide criterion data; as they correlated with each other ($r = .44$), they were linearly combined into a single composite performance index.

No relationship was found between the ability composite and the performance composite ($r = .06$, n.s.). The congruence model of work motivation was significantly related to the performance composite ($r = .18$, $p < .001$), and the interaction term entered into the regression equation after ability and motivation was non-significant.

Summary

The major conclusion reached from the literature reviews, laboratory studies and field research efforts is that statistically significant algebraic interaction terms are extraordinarily difficult to find whether studying ability and motivation, ability and situation, ability and the congruence of person and perceived environment, and whether the analyses are accomplished at the individual or organizational (classroom, work unit) level when the moderated regression model is used for data analysis.

Throughout the studies conducted under this Contract, the only analytic technique considered appropriate for exploring the issue of interaction was the moderated multiple regression technique (MMR). This technique makes the stringent requirement that only interaction effects which add significantly to the prediction of performance after the main (linear) effects can properly be construed to be interactions.

The above should not be interpreted to mean that situational variables make no contribution to the prediction of performance. On the contrary, for the studies conducted under this Contract, only one failed to reveal an effect of situational variables on performance (Parkington & Schneider). This consistency in predictive capability is noteworthy because of the wide variety of ways in which situational issues were conceptualized and operationalized. Thus, Locke et al. employed an experimental manipulation of goals, Hoffman used individual and aggregated classroom questionnaire data, Howard's index consisted of perceptions of task attributes, and Hannan developed an index of person-perceived environment fit.

The finding that both ability and situation combine additively to

predict performance has considerable implications for organizational effectiveness. The fact suggests that aggregate performance levels can be optimized only when adequate attention is lavished on selection based on ability and concern for the work environment; either, alone, our findings suggest, will generally produce less effective levels of performance.

The fact that ability and situation combine linearly in the prediction of performance means that high ability people perform better under favorable work environment conditions and so do people with lower levels of ability. A finding of an interaction would have added to this simple logic the idea that situations differentially affect high and low ability people. For practical purposes we can be thankful that the findings, for a change, favor the more parsimonious conclusion.

PUBLICATIONS RESULTING FROM THE CONTRACT

1. Bartlett, C. J., Bobko, P., & Pine, S. M. Single-group validity: Fallacy of the facts? Journal of Applied Psychology, 1977, 62, 155-157.
2. Bartlett, C. J., Bobko, P., Mosier, S. B., & Hannan, R. L. Testing for fairness with a moderated multiple regression strategy: An alternative to differential analysis. Personnel Psychology, 1978, 31, 233-242.
3. Erez, M. Feedback: A necessary condition for the goal-setting - performance relationship. Journal of Applied Psychology, 1977, 62, 624-627.

4. Guion, R. M. "Content validity" in moderation. Personnel Psychology, 1978, 31, 205-214
5. Locke, E. A., Mento, A. J., & Katcher, B. L. The interaction of ability and motivation in performance: An exploration of the meaning of moderators. Personnel Psychology, 1978, 31, 269-280.
6. Owens, W. A. Moderators and subgroups. Personnel Psychology, 1978, 31, 243-248.
7. Schein, V. E. Sex role stereotyping, ability and performance: Prior research and new directions. Personnel Psychology, 1978, 31, 259-268.
8. Schmidt, F. L., & Hunter, J. E. Moderator research and the law of small numbers. Personnel Psychology, 1978, 31, 215-232.
9. Schneider, B. A note on Johnston's "A new conceptualization of source of organizational climate." Administrative Science Quarterly, 1976, 51, 502-504.
10. Schneider, B. Increasing the validity of ability measures. Personnel, 1978, 55, 62-68.
11. Schneider, B. Person-situation selection: A review of some ability-situation interaction research. Personnel Psychology, 1978, 31, 281-298.
12. Schneider, B. Implications of the conference: A personal view. Personnel Psychology, 1978, 31, 299-304.
13. Schneider, B., & Dachler, H. P. A note on the stability of the Job Descriptive Index (JDI). Journal of Applied Psychology, 1978, 63, 650-653.

14. Wanous, J. P. Realistic job previews: Can a procedure to reduce turnover also influence the relationship between ability and performance? Personnel Psychology, 1978, 31, 249-258.

REFERENCE NOTE

1. Schneider, B., & Dachler, H. P. Work, family, and career considerations in understanding employee turnover intentions. Unpublished ONR Technical Report, Department of Psychology, University of Maryland, College Park, 1978.

REFERENCES

- Atkinson, J. W. Motivational determinants of intellectual performance and cumulative achievement. In, J. W. Atkinson and J. O. Raynor (Eds.), Motivation and achievement. New York: Wiley, 1974
- Bass, B. M., & Barrett, G. V. Man, work and organizations. Boston: Allyn & Bacon, 1972.
- Blanz, F., & Ghiselli, E. E. The mixed-standard scale: A new rating system. Personnel Psychology, 1972, 25, 185-199.
- Cohen, J., & Cohen, P. Applied multiple regression/correlation analysis for the behavioral sciences. Hillsdale, N.J.: Lawrence Erlbaum, 1975.
- Flaugher, R. L. The new definitions of test fairness in selection: Developments and implications. (GRE BOARD Research Report GREB No. 72-4R.) Princeton: Educational Testing Service, 1974.
- Guion, R. M. Personnel testing. New York: McGraw-Hill, 1965.
- Saal, F. E., & Landy, F. J. The mixed standard rating scale: An evaluation. Organizational Behavior and Human Performance, 1977, 18, 19-35.
- Schneider, B. Person-situation selection: A review of some ability-situation interaction research. Personnel Psychology, 1978, 31, 281-297.

Smith, P. C., Kendall, L. M., & Hulin, C. L. The measurement of satisfaction in work and retirement: A strategy for the study of attitudes.
Chicago: Rand McNally, 1969.

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